

RESULTS AND DISCUSSION

A detailed map of harbor seal haulout locations was done for the Point Reyes area because: 1) the Point Reyes data sets were made available; and 2) mixing the aerial and land-based haulout data sets was not advised. Haulout sites along the Point Reyes coastline are located from Tomales Point south to Point Bonita. This detailed map of finer-scale data for the Point Reyes area was acquired from multiple surveys, and captured the time when greater numbers of harbor seals were on shore during the peak molt (June-July) in this area.

This map also summarizes habitat use (relative importance and pattern of use during breeding, pupping, and molting) of the haulout sites during 2006 at Tomales Point, Tomales Bay, Point Reyes Headland (area of Special Biological Significance), Drakes Estero, Double Point (area of Special Biological Significance), Duxbury Reef, Bolinas Lagoon, and Point Bonita. Harbor seals at Double Point and Drakes/Limantour Esteros is significant and accounted for more than 50% of total seals in the Point Reyes area that were counted during both breeding and molt seasons (Allen *et al.*, 2004; Manna *et al.*, 2006). During breeding and molting, relative abundance increases at Drakes Estero at the two sites, whereas during winter (and during herring spawns) relative abundance increases in Tomales Bay (Allen, pers. comm., 2006). Pupping also occurs to the north of Point Reyes on Bodega Rock and Bodega Point. See the overview map for Pacific harbor seal in the study area (Figure 4.11) and related description for additional information.

Monitoring and Trends at Pt. Reyes. Since 1976, long-term monitoring studies of harbor seals have been conducted at selected colonies by Sarah Allen (S. Allen, pers. comm.). Between 1997 and 2001 the population trend of harbor seals at Point Reyes appeared to be stable: annual maximum counts for the breeding seasons ranged between 2,481 and 3,506 harbor seals, and annual average counts ranged from 1,744.6 and 2,511.1 (range of SE = 122.5 to 379.0) (Allen *et al.*, 2004). The latest available data for 2006 yielded an average of 2,317 harbor seals (SE = 225; maximum=2,790), including 1,402 pups during the breeding season and a maximum of 4,560 (all age classes) during the molt (Manna *et al.*, 2006). In 2006, however, there was an overall decline (compared to the previous

five years) in the number of pups produced at Pt. Reyes; this decline may be related to changes in marine conditions or human use patterns causing disturbance (Manna *et al.*, 2006). Upwelling was reduced in 2006 and this may have affected food availability for harbor seals, which, in turn, may have affected overall number of pups (Manna *et al.*, 2006).

Disturbance. The trend studies cited above have also documented disturbance of harbor seals at Drakes and Limantour Esteros (by people and boats) and at Tomales Bay (by motorboats). Reduced human disturbance (e.g., from clam digging) and the SEALS program (see below) likely contributed to an increase in presence of seals in Tomales Bay between 2000 and 2004 (Allen *et al.*, 2004). Harbor seals were also disturbed at Double Point, (one of the primary pupping sites at Pt. Reyes), due to commercial fishing near the haulout site (Allen *et al.*, 2004). Other primary pupping sites are located at Bolinas Lagoon, Tomales Point, Tomales Bay, and Drakes Estero/Limantour Estero (Allen *et al.*, 2004). Disturbance to seals at Drakes Estero/Limantour Spit, was significantly reduced when a seasonal closure to boats (kayaks) was enforced by the National Park Service in 1995. However, disturbance by hikers and boats continues at Limantour Estero (Allen *et al.*, 2004), and, across all sites, hikers and boaters remain the two most frequent sources of human related disturbance (Manna *et al.*, 2006).

Education and Outreach. A monitoring project (designed by Sarah Allen, Senior Science Advisor, PRNS, and Gulf of the Farallones National Marine Sanctuary staff) was conducted from 1997-2005 at Bolinas Lagoon and Tomales Bay by the SEALS program. The Sanctuary Education Awareness and Long-term Stewardship (SEALS) program monitored the effects of human activities on seal behavior until it was stopped in 2005. Since then, disturbances have again increased. This interpretive enforcement program and education outreach was successful at reducing human disturbance on harbor seals in these areas.